be made to Messina, where the steamer will be taken to Naples again. This excursion will not cost more than 358 lire. The third excursion is a variant of the preceding, but gives more time to Naples and its vicinity. It allows three days for Naples, and joins up with the other excursion at Catania. The cost will be about 366 lire. All excursionists are invited to visit the exhibition at Turin on November 1, and on the evening of that day the excursion will be regarded as closed.

UNIVERSITY AND EDUCATIONAL NEWS

The Japanese Minister of Education has announced that two new imperial universities will be opened. One will be at Sendai, on the eastern coast, and the other at Fukuoka, on the island of Kiushu.

Dr. Jack P. Montgomery, of the Mississippi Agriculture and Mining College, has been appointed adjunct professor of chemistry at the State University of Alabama.

Homer C. Washburn, B.S., Ph.C., has been appointed professor of pharmacy in the University of Colorado. He is a graduate of the scientific and pharmaceutical departments of the University of Michigan. For seven years he has been a member of the faculty of the University of Oklahoma and for the last six years dean of the School of Pharmacy.

Mr. W. A. Whitaker, Jr., of the department of chemistry, College of the City of New York, has accepted the associate professorship of metallurgy in the University of Kansas.

S. D. Magers, assistant professor of physiology in the Michigan State Normal College, Ypsilanti, succeeds Dr. E. R. Downing as professor of biology at the State Normal at Marquette, Mich.

Thomas L. Patterson, M.A., with the Gypsy Moth Parasite Laboratory during the past summer, has been elected professor of biological sciences at Highland Park College, Des Moines, Iowa.

Recent appointments at the State University of North Dakota are the naming of H. E. French, A.B. (Washington State, 1902), M.D. (Northwestern, 1907), and recently of the medical school of the University of South Dakota, as dean of the School of Medicine; Carl F. Raver, A.B. (Michigan), recently city bacteriologist for Oklahoma City, Oklahoma, as chemist in the State Public Health Laboratory; Roy E. Christie, A.B. (North Dakota, 1911), as assistant bacteriologist at the same place; Leon V. Parker, as bacteriologist in charge at the branch Public Health Laboratory at Minot, and Alfred Larson to fill a similar position in the branch laboratory at Bismarck.

DISCUSSION AND CORRESPONDENCE

THE GRAND CANYON OF THE COLORADO

On page 89 of Science, No. 864 (July 21, 1911), I observe a special article by H. H. Robinson entitled "The Single Cycle Development of the Grand Canyon of the Colorado."

During the summer and autumn of 1908 I spent several months in the Grand Canyon in the region about Shinumo Creek, making a study of the geology of the Shinumo quadrangle. The results of this study were presented at Yale University in the form of a Doctor's thesis, a part of which, dealing with the rocks of the Vishnu and Grand Canyon series, has been published in the *American Journal of Science* (May and June, 1910) under the title "Contributions to the Geology of the Grand Canyon." I have since returned twice to the region to extend the same study in the interest of the United States Geological Survey; the entire report on the geology of the Shinumo quadrangle is to be published at a future date as a Bulletin of the Geological Survey.

My observations in that region (recorded in the thesis, but not yet published) are entirely in accord with the conclusions of Davis and Robinson in regard to the dependence of the benches in the canyon upon the character of the strata.

The Shinumo quadrangle is a critical area for the study of the two greatest benches within the canyon, the Esplanade and the Tonto Platform, since it is there that the profile of the canyon wall changes from that which is characteristic of the Kaibab division to that which is characteristic of the Kanab. Eastward from Havasupai Point, a great promontory of the southern wall in the center of the quadrangle near Bass Camp, the scenery is that which is characteristic of the Kaibab division. This is the scenery that is familiar to most of the visitors at the Grand Canyon, from the views in the vicinity of El Tovar hotel. The walls are greatly dissected, particularly on the northern side of the canyon. Great amphitheaters run far back into the wall, filled with fantastic buttes and temples, and trenched by innumerable side gorges. The profile of the wall is especially distinctive; the edges of the Paleozoic strata descend rapidly through a series of cliffs, steep slopes, and narrow ledges to the Tonto Platform, 3,000 feet below the rim of the canyon; within the Tonto Platform is the Granite Gorge, at the bottom of which the river flows upon Archean rocks.

Turning westward from Havasupai Point, there is a striking change. Directly below, about 1,000 feet beneath the rim, a great flat-topped spur of red Supai sandstone runs far out into the canyon. Farther westward, more and more of these spurs appear, each capped with a similar platform which always lies upon the same layer of red sandstone. Gradually the platform widens and becomes a broad expanse of red rock, which is covered with patches of scanty soil and dotted with scrubby trees of juniper and pinyon. The buttes and temples disappear; the walls are much less dissected by side gorges and extend in solemn palisades. The cross-section of the canyon wall is more simple, consisting of a wide outer valley whose floor is the great red platform, and a narrow inner canyon, at the bottom of which is the river. This platform is named the Esplanade. The wall of the inner canyon is stupendous, the edges of the Tonto, Redwall, and Supai strata appearing almost as a single cliff, 3,000 feet in height. This type of scenery is characteristic of the entire canyon west of the Kaibab division.

Opposite Havasupai Point, in the central part of the quadrangle both platforms are present, separated vertically by 2,000 feet. It is therefore manifestly impossible that the two platforms represent one base-level of erosion.

The greater dissection of the walls in the Kaibab division is, of course, due to the greater altitude of the plateaus on either side of the canyon and the consequently greater rainfall that prevails.

The change in the profile of the wall to the westward can be clearly shown to depend upon certain variations in the thickness and character of the Paleozoic strata: Each ledge of the canyon wall is made by the wasting back of beds of weak strata from the summit of a resistant, cliff-making stratum below. The width of a ledge tends to increase with the thickness of the weak strata; it is also controlled by the relative thickness and strength of the overlying strata which defend the retreat of the wall above.

In the Kaibab division, the Bright Angel shale of the middle part of the Tonto group is uniformly weak and has wasted back rapidly from the summit of the basal Tapeats sandstone of the Tonto group, leaving the wide ledge known as the Tonto Platform. As the Bright Angel shale is traced westward into the Shinumo quadrangle, layers of resistant snuff-colored limestone begin to appear in the middle of the formation. These layers, known locally as the Snuffy limestone, gradually increase in thickness, making two delicate parallel cliffs which are a conspicuous feature in the interior of the canyon. The Snuffy limestone increases the resistance of the Bright Angel shales to erosion, so that they retreat more slowly and make a steeper slope; westward from Havasupai Point the Tonto Platform fades gradually and is no longer a prominent topographic feature in the canyon. At the same time, the Muav limestone of the upper part of the Tonto

group and the massive Redwall become gradually thicker to the northward and westward, and the inner canyon narrows as these strata become more and more effective in defending the retreat of the wall.

In the Kanab division, the Supai formation of the Aubrey group consists of weak red shales in the upper portion and resistant sandstones below. The shales waste back from the summit of the sandstones, leaving the Esplanade platform. In the western part of the quadrangle, where the Esplanade is fully developed, the thickness of the Supai shales is 550 feet; while that of the overlying massive white Coconino sandstone, which defends the retreat of the outer wall, is only 250 feet. Eastward from Havasupai Point, in the Kaibab division, the thickness of the Supai shale has decreased to 300 feet (becoming still thinner in the Bright Angel quadrangle to the eastward); while that of the Coconino sandstone has increased to 400 feet; the Esplanade fades to a narrow ledge in this part of the canyon.

L. F. Noble
Valyermo, California,
July 27, 1911

Draughts and Colds

To the Editor of Science: In reading the interesting and instructive communication by Mr. M. Mott-Smith in the August 4 number of Science, I was impressed by the closing paragraph, which follows:

> Though the above explanations are only a rehash of well-known principles, I hope they may be of some use. In return I wish some one would explain to me just what is the danger of the open window. Why is a little sneaking draught in the house a source of colds and grippe, while a high wind out of doors a pleasure and a benefit? This is a problem that has long puzzled me, but perhaps it is a foolish question.

This problem has doubtless puzzled a great many besides Mr. Mott-Smith, and is perhaps "a foolish question"; but why it should be a *foolish question* seems also a puzzle to a layman. The problem appears to involve the question, what is the pathology of a "bad cold"? The writer has propounded that question to several intelligent physicians, and its "foolishness" is attested by failure to elicit any attempt at a lucid reply.

The writer has been compelled to construct for himself what engineers would call a "working hypothesis" to cover this problem. and has even ventured to apply a quasi scientific name to fit the case, which is offered as a reply to Mr. Mott-Smith for what it may be worth, or otherwise, with all due diffidence and a proper sense of his temerity in trenching upon hallowed ground.

The answer thus boldly formulated as to the proximate cause of a "bad cold" is, *a disturbance of the thermo-neural equilibrium* of the surface of the body.

It is a matter of common experience that if a portion of the body, the head and neck, for instance, is exposed to a strong breeze while the remainder of the body is of normal or supernormal temperature, bad cold, grippe, etc., are pretty sure to result, while the "high wind out of doors," which envelops the whole body, has no such effect. One sitting in a country office on a very cold day, his feet thrust under a desk and his back to a glowing grate, shall after a while fall to sneezing, and if he is wise he will get up and stir around in order to restore this disturbed equilibrium in the temperature of the cutaneous nerves.

In this connection it may be said that the writer has found what is to him a completely satisfactory solution of the weighty question, how to deal with the long and oppressive summer heat in the southern states, to wit, the electric fan.

Nearly all persons are afraid to allow a fan to blow upon them while asleep; and indeed if the body is partially exposed to the action of the fan it is a dangerous practise. On the other hand it is the writer's constant practise to have a 16-inch fan blowing upon him all night in hot weather. When the temperature is very high the fan is run at top speed, and is graduated down for lower temperatures.

The point to be made is, that the fan is so located that it is in line with the sleeper's body, taking him from his feet to his head, and thus enveloping his entire body in the